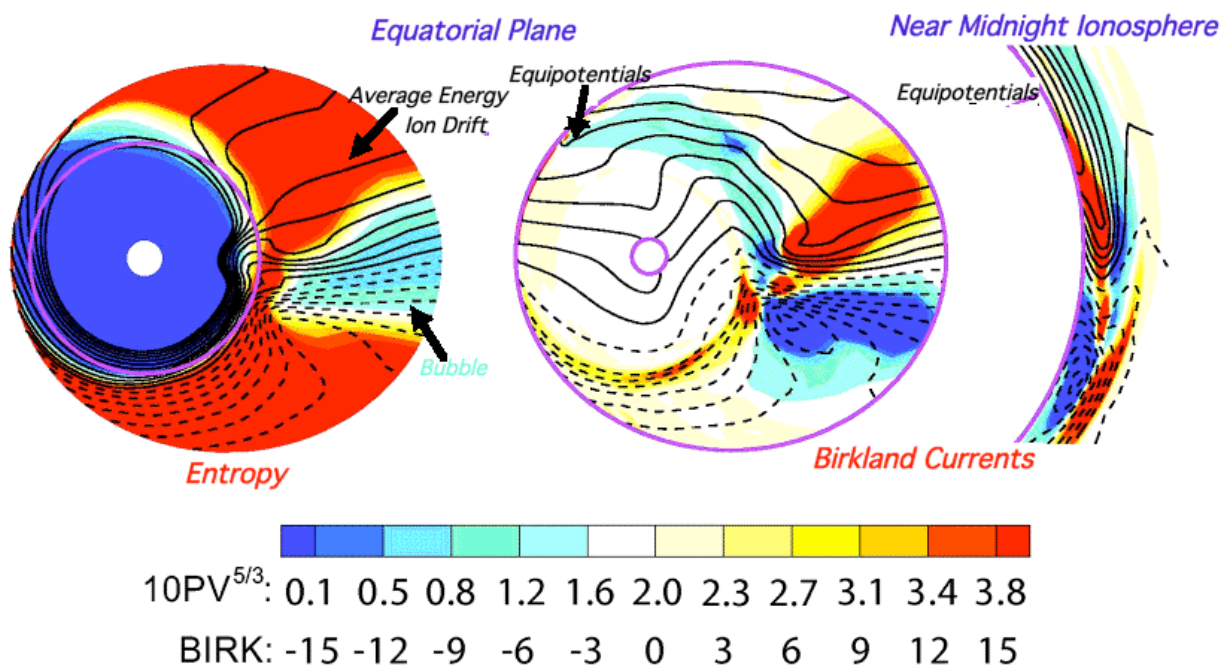


Injection Of A Plasma Bubble Into The Inner Magnetosphere

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Substorms inject fresh particles into the inner magnetosphere. Observations have made it increasingly clear that these injections originate as plasma-sheet bubbles (flux tubes with decreased entropy) that are created in the substorm unloading process and then drawn into the inner magnetosphere. The figure shows a Rice Convection Model (RCM) simulation of a bubble injection, two minutes after the onset of an idealized substorm. This simulation represents the first attempt to represent a substorm bubble with the RCM. The work continues, focusing on simulations that include more complete and accurate representations of the physics.



The strong currents on the sides of the bubble, seen in the center figure, are part of the substorm current wedge that create strong westward electric fields in the bubble, corresponding to rapid earthward flow. Ionospheric map on right shows how the Birkeland currents on the sides of the bubble distort the equipotentials and thus the electric field.

Reference: Zhang, J. C., et al. (2008), Injection of a bubble into the inner magnetosphere, *Geophys. Res. Lett.* 35(2), L02110, Doi 10.1029/2007gl032048.

